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REMARKS

Claims 1, 5, 17, 25, 26, 31, 34, and 39-45 are amended hereby. Claims 4, 6, 8, 14, 16, and 30 are canceled. No new claims are added. Accordingly, after entry of this Amendment, claims 1-3, 5, 7, 9-13, 15, 17-29, and 31-48 will remain pending.

In the Office Action dated November 3, 2006, the Examiner rejected claims 1, 6-8, 14-17, 20-27, 30-36, 39-41, and 47-48 under 35 U.S.C. § 102(b) as anticipated by Schaper et al. (U.S. Patent No. 5,802,856). Claims 2-3, 13, 19, 29, and 37-38 were rejected under 35 U.S.C. § 103(a) as unpatentable over Schaper et al. in view of Hiramatsu et al. (U.S. Patent No. 6,731,496). In addition, claims 4-5, 9-12, 18, 28, and 42-46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schaper et al. in view of Oda et al. (U.S. Patent No. 6,474,986). The Applicant respectfully disagrees with each of these rejections and, therefore, respectfully traverses the same.

Claims 1-33, 34-38, and 39-48 are patentably distinguishable over the references cited by the Examiner because they recite an apparatus for controlling a temperature of a substrate, the substrate having a lower surface and an upper surface on which a substrate processing is performed, a method of making a substrate table capable of controlling a temperature of a substrate, the substrate having an upper surface and a lower surface supported by a thermal surface of the substrate table on which processing of the substrate is performed, and a method of controlling a temperature of a substrate, the substrate having an upper surface and a lower surface supported by a thermal surface of a substrate table on which processing of the substrate is performed that combine a number of features including, among them, at least two thermoelectric modules of the plurality of thermoelectric modules are arranged such that a space is defined between them, one or more elements selected from a group consisting of wires for the thermoelectric modules, gas lines, and pins configured to place and remove the substrate is placed in the space between the thermoelectric modules. None of the references describe or suggest an apparatus or a method that includes at least this feature. As a result, the Applicant respectfully submits that the references cannot be relied upon, either alone or in combination, to anticipate or render obvious any of claims 1-48. Accordingly, the Applicant respectfully requests that the Examiner withdraw the rejections of the claims and pass this application quickly to issuance.

The primary reference relied upon by the Examiner, Schaper et al., describes a multizone bake/chill thermal cycling module. As described, the module includes a substrate 32, such as a

semiconductor wafer or flat panel display, that is baked and chilled through thermal contact with a thermally conductive plate 34. (Schaper et al. at col. 4, lines 22-26.) The thermally conductive plate 34 overlies an array of thermoelectric devices ("TEDs") 36 and a heat exchanger 38. (Schaper et al. at col. 4, lines 26-27.) In the preferred embodiment, the TEDs 36 are capable of both heating and cooling. (Schaper et al. at col. 4, lines 53-54.) The fluid heat exchanger 38 is in thermal contact with the TEDs 36 and is located beneath the layer of TEDs 36. (Schaper et al. at col. 4, lines 55-56.) The heat exchanger 38 has passages or channels 40 through which fluid may flow for heating or cooling. (Schaper et al. at col. 4, lines 55-56.) The temperature of the plate 34 is determined primarily by the temperature of the fluid flowing through the heat exchanger 38. (Schaper et al. at col. 4, lines 61-62.) The layer of TEDs 36 provide improved control of the temperature of the plate 34, and the different fluid temperatures combined with the low thermal mass allow the single plate to be used for both heating and cooling. (Schaper et al. at col. 4, lines 63-67.) The TEDs 36 are individually controllable (see, e.g., Schaper et al. at col. 5, lines 5-6) or may be controlled in groups. (Schaper et al. at col. 6, lines 28-34 and lines 57-60, for example.)

In several instances, Schaper et al. discusses the juxtaposition of the TEDs 36 as being immediately adjacent to one another, with no spaces therebetween. For example, at col. 4, lines 50-53, Schaper et al. states:

> For illustrative clarity, TEDs 36 are shown with spaces between them. In the preferred embodiment, however, **there are no spaces between TEDs 36**.

(Emphasis added.) Similarly, in col. 6, at lines 51-52, Schaper et al. states:

> it is preferred to have shapes that form a continuous tiling beneath the plate so that **no gaps** exist between TEDs 36.

(Emphasis added.) Accordingly, Schaper et al. would be read by those skilled in the art to provide an array of TEDs where no spatial gaps exist between the individual TEDs.

This arrangement is contrary to the arrangement of the present invention where, among other features, the apparatus or method includes at least two thermoelectric modules of the plurality of thermoelectric modules are arranged such that a space is defined between them, one or more elements selected from a group consisting of wires for the thermoelectric modules, gas lines, and pins configured to place and remove the substrate is placed in the space between the thermoelectric modules. The disclosure within Schaper et al., therefore, provides for an arrangement that is antithetical to that of the present invention. At least for this reason, Schaper

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et al. cannot be relied upon to anticipate any of claims 1-48. In addition, at least for this same reason, those skilled in the art would not think to combine Schaper et al. with any of the remaining references to render obvious any of claims 1-48.

Hiramatsu et el. does not cure the deficiencies noted with respect to Schaper et al. and, as a result, cannot be combined with Schaper et al. in the manner suggested by the Examiner. Hiramatsu et al. describes an electrostatic chuck 101 with an electrostatic layer 2 with a dielectric layer 4 thereon containing the electrostatic electrodes. (Hiramatsu et al. at col. 5, lines 10-19.) A resistance heating element 5 is provided inside of the ceramic substrate 1, which is a part of the electrostatic chuck 101, to control the temperature of the silicon wafer 9. (Hiramatsu et al. at col. 5, lines 26-30.) Bottomed holes 11, into each of which a temperature element is inserted, and through holes 12, through which lifter pins extend, are provided in the electrostatic chuck 101. (Hiramatsu et al. at col. 5, lines 26-40.)

Hiramatsu et al. does not describe or suggest many of the features recited by claims 1-48. Among the many deficiencies, Hiramatsu et al. does not describe or suggest a first thermal assembly arranged in the substrate table and comprising a plurality of thermoelectric modules. Without any discussion of a plurality of thermoelectric modules, Hiramatsu et al. does not describe or suggest any arrangement where a plurality of thermoelectric modules substantially completely underlie the thermal surface. Moreover, Hiramatsu et al. does not describe a second thermal assembly in thermal communication with the thermal surface, wherein the second thermal assembly comprises a channel that carries a heat-transfer fluid.

The Applicant respectfully submits, therefore, that Hiramatsu et al. presents a construction for an electrostatic chuck 101 that differs appreciably from the combination recited by claims 1-48. At least in part for this reason, the Applicant respectfully submits that those skilled in the art would not look to Hiramatsu et al. to supply the deficiencies noted with respect to Schaper et al. In addition, since Schaper et al. explicitly teaches that there are no gaps between the TEDs 36, those skilled in the art would not be motivated to combine Hiramatsu et al. with Schaper et al. at least for this reason. Simply, there are no spaces between the TEDs 36 in the construction taught by Schaper et al. where elements of any kind may be positioned.

Oda et al. also does not cure the deficiencies noted with respect to Schaper et al. and, as a result, cannot be combined with Schaper et al. to render obvious any of claims 1-48. Oda et al. describes a hot plate cooling method and heat processing apparatus that includes a hot plate P on which the wafer W is positioned. (Oda et al. at col. 11, lines 30-36.) A heater H made of

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Nichrome wire or sintered metal is provided on the rear face of the hot plate P, and the plate P is heated to a predetermined temperature by being heated by this heater H. (Oda et al. at col. 11, lines 36-39.) A plurality of nozzles 151 for blowing a cooling gas such as air or nitrogen onto to rear face of the hot plate P are provided in the cooling chamber S2. (Oda et al. at col. 11, lines 46-48.) Three ascending and descending pins 153 for raising and lowering the wafer W penetrate the hot plate P. (Oda et al. at col. 11, lines 53-57.)

Low-temperature cooling gas is used to regulate the temperature of the hot plate P. (Oda et al. at col. 12, lines 7-12.) A cooling device 106, which uses a Peltier element, and a cooling container 161 are associated with gas supply pipes 152 that penetrate the cooling container 161. (Oda et al. at col. 12, lines 7-18.) The Peltier element 107 touches the cooling container 161 and a cooling pipe 162 touches the Peltier element 107. (Oda et al. at col. 12, lines 27-32.) The gas supply pipes 152 extend from the cooling gas supply source 163, through the cooling container 161, to the cooling chamber S2. (Oda et al. at col. 12, lines 37-47.) The Peltier element 107 assists in cooling the gas supplied through the gas supply pipes 152. (Oda et al. at col. 13, lines 13-25.) There are, however, no Peltier elements 107 provided in the hot plate P. The Peltier elements 107 are external to the cooling chamber S2. (Oda et al. at Fig. 14, for example.)

As the discussion in Oda et al. makes apparent, Oda et al. does not describe or suggest many of the features recited by claims 1-48. Among the many deficiencies, Oda et al. does not describe or suggest a first thermal assembly arranged in the substrate table and comprising a plurality of thermoelectric modules. Without any discussion of a plurality of thermoelectric modules, Oda et al. does not describe or suggest any arrangement where a plurality of thermoelectric modules substantially completely underlie the thermal surface. Moreover, Oda et al. does not describe a second thermal assembly in thermal communication with the thermal surface, wherein the second thermal assembly comprises a channel that carries a heat-transfer fluid.

The Applicant respectfully submits, therefore, that Oda et al. presents a construction for hot plate P that differs appreciably from the combination recited by claims 1-48. At least in part for this reason, the Applicant respectfully submits that those skilled in the art would not look to Oda et al. to supply the deficiencies noted with respect to Schaper et al. Accordingly, those skilled in the art would not be motivated to combine Oda et al. with Schaper et al.

Each of the rejections having been addressed, the Applicant respectfully submits that all of claims 1-48 are in a condition for allowance, and such is respectfully requested.

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Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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